A LOW-COST HIGH-SPEED MULTIPLIER/ACCUMULATOR UNIT FOR DECISION FEEDBACK EQUALIZERS

ABSTRACT OF THE DISCLOSURE

A multiplier device for multiplying one of a discrete set of digital level values with a filter coefficient in a filter device implemented in a decision feedback equalizer comprises: a decoder device for receiving a discrete digital level value to be multiplied and generating control signals according to the digital level value; an inverter circuit providing two parallel operations, each operation including multiplying the determined number by either +1/-1 in accordance with the control signals for generating two intermediate results; a multiplier circuit receiving the two intermediate results and providing respective parallel operations for multiplying a corresponding intermediate result by +1 or zero (0) in accordance with a control signal and generating further intermediate results; a logic circuit for shifting bits of one further intermediate result to effect a multiplication of one of the further intermediate output result with a discrete digital level value different than any of the original plurality of discrete digital level values; and, an accumulator device for adding the results of the logic circuit shift multiplication with the further intermediate output result to obtain a final multiplication result. The multiplier device is implemented for performing convolution operations is the filter and generating filter outputs implemented for reducing inter-symbol-interference in a communication system. The multiplier device advantageously achieves the desired multiplications for convolution operations using less semiconductor real estate, and at a greater speed and less redundancy.